

Update on Developing a PIT-tag System for the Unmodified Spillbays at Bonneville Dam

Sandy
Downing
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FFDRWG Meeting

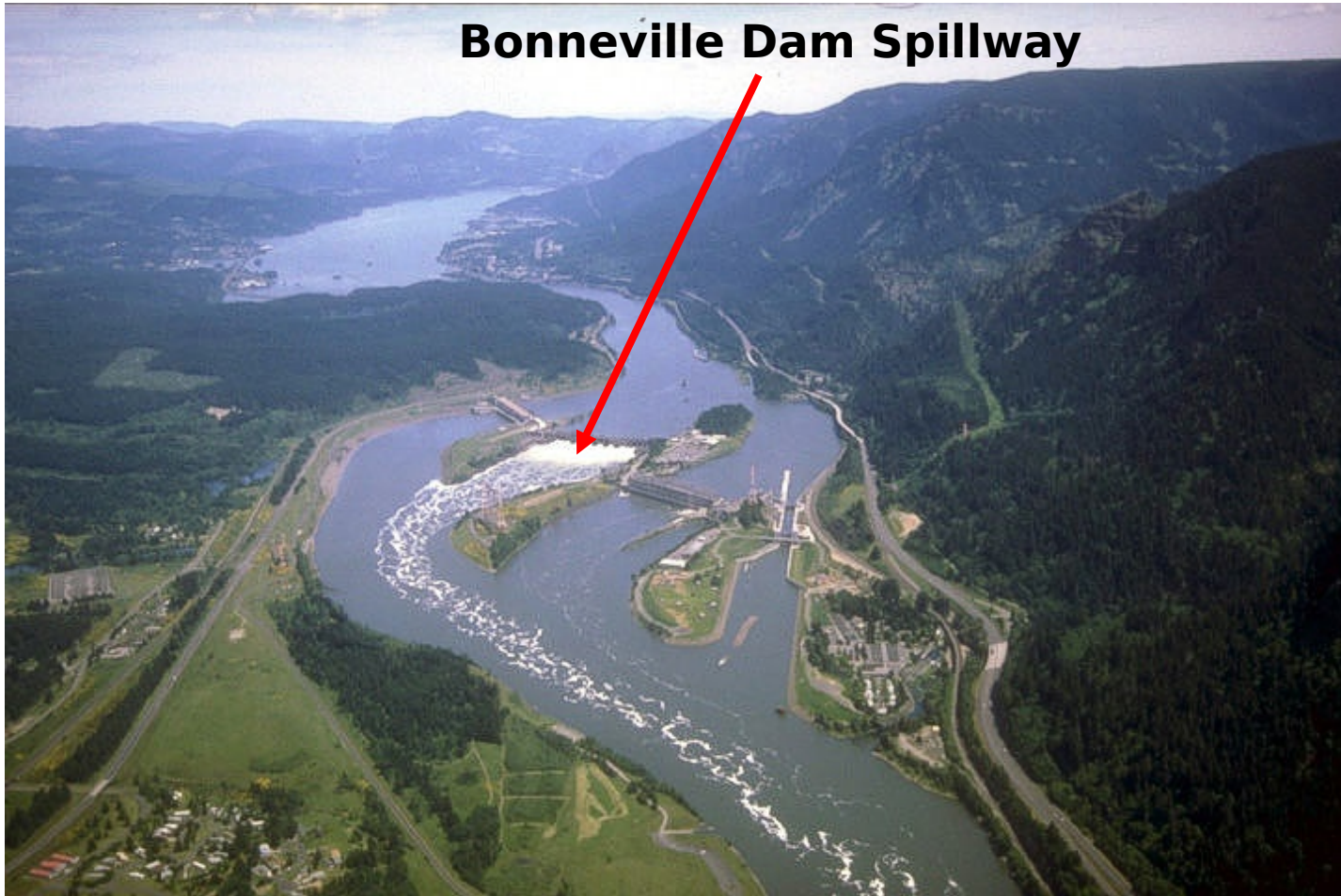
January 2010



Destron Fearing™

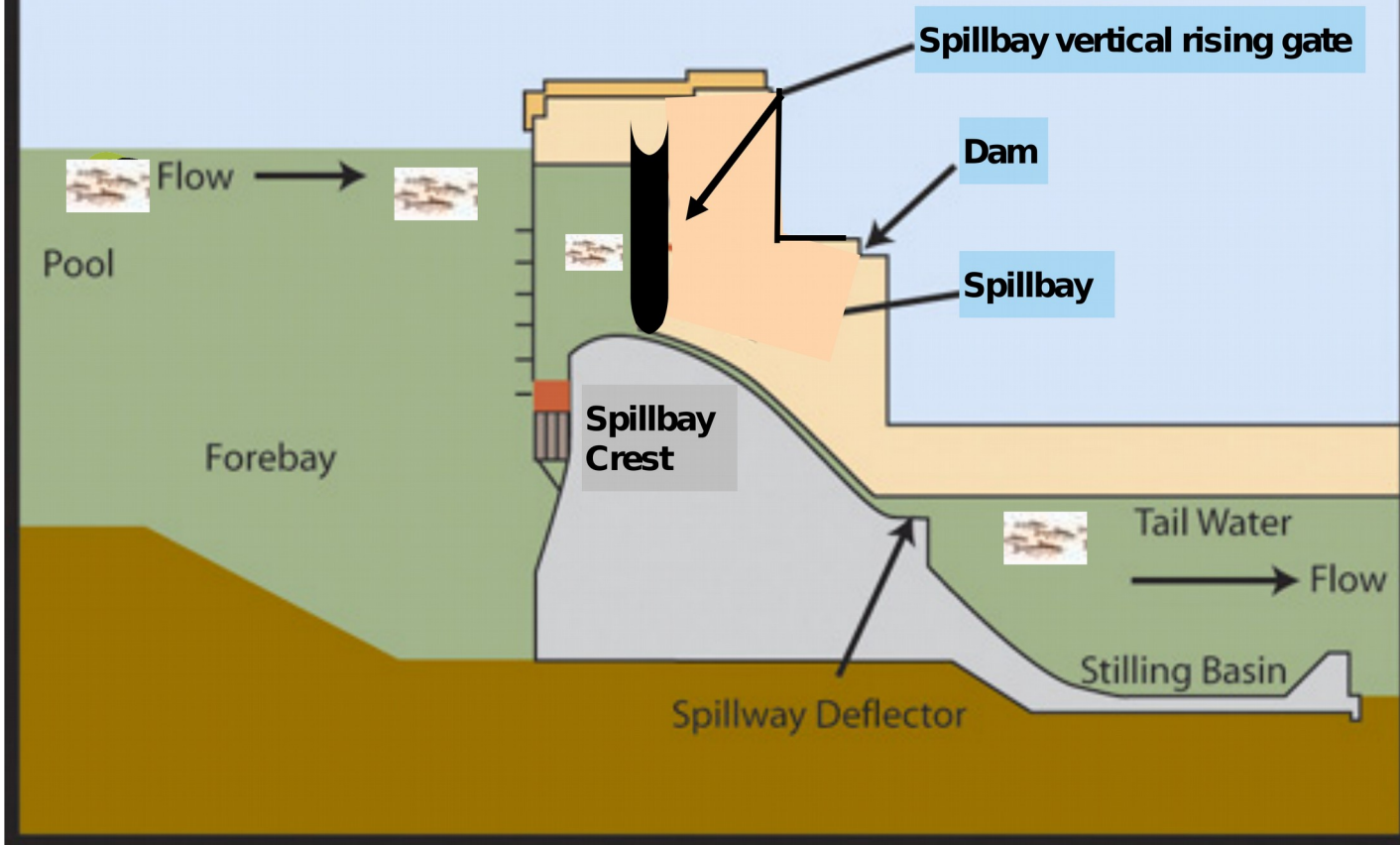


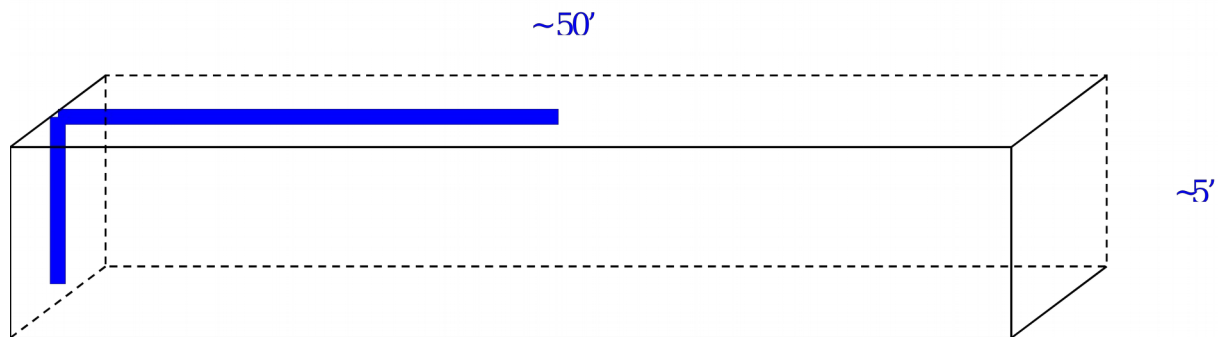
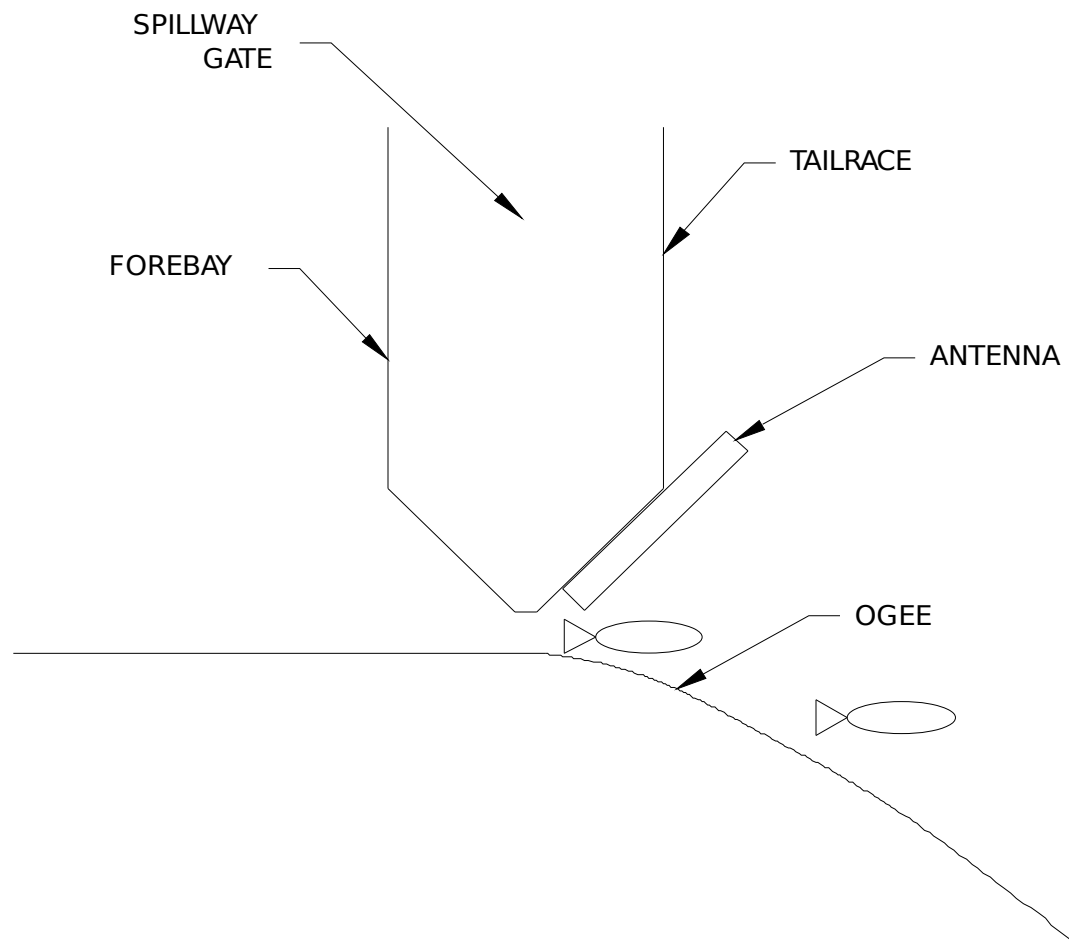
Bonneville Dam Spillway





Unmodified Spillbay





Test Facility in the Spillbay Repair









Shielding designs with hugging antenna	Current (A) needed to detect a 12-mm tag 33" below the lower antenna end	
	Away from spillbay gate	Next to spillbay gate
No ferrite tiles	7.04	11.00
Strips of ferrite tile	6.56	9.12
Full sheet of ferrite tiles	6.40	8.85
Full sheet of ferrite tiles and aluminum shield	7.56	9.30

ps of ferrite tiles where gate touched the antenna plane provided sufficient shie

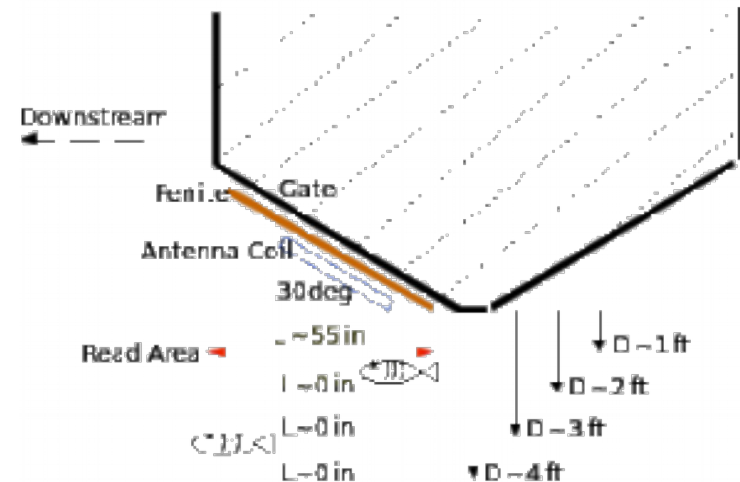


Photo shows the 5-ft-wide antenna at the outer edge of the gate. It shows how far out it extends and the gap.

5-foot wide hugging antenna

distance D (ft)	activation distance L (in)	broadcasted for a regular tag
1	88	3.9
2	65	2.9
2½	43	1.9
3	0	0

3-foot wide hugging antenna

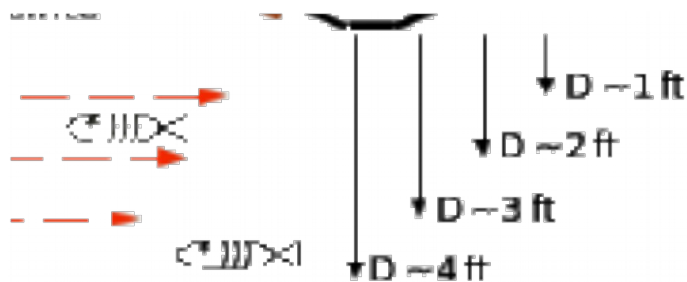


Gate open at a distance D (ft)	Horizontal activation distance L (in)	#of telegrams broadcasted for a regular tag
1	55	2.4
2	0	0
3	0	0
4	0	0

Vertical and intermediate angled antenna designs

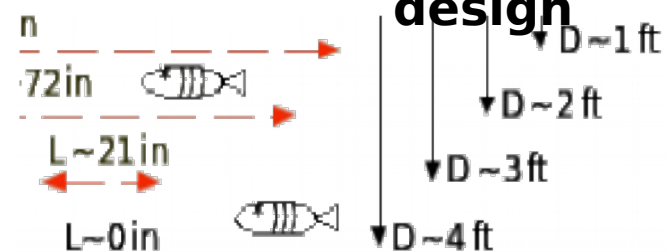


3-foot wide Vertical antenna design



Horizontal activation distance L (in)	# of telegrams broadcasted for a regular tag
120	5.3
105	4.6
85	3.7
35	1.5

3-foot wide intermediate angled antenna design



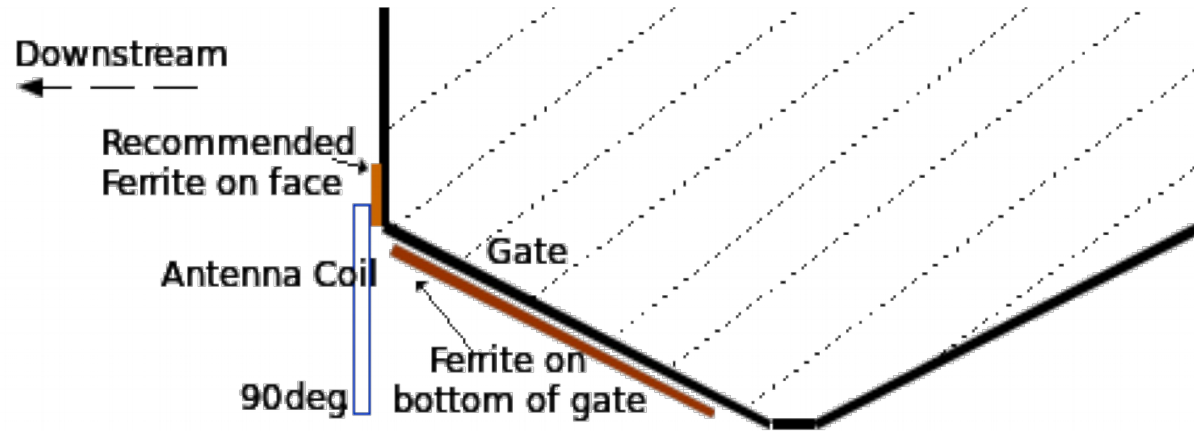
Horizontal activation distance L (in)	# of telegrams broadcasted for a regular tag
89	3.9
72	3.2
21	0.9
0	0

Table 3. Maximum vertical read distances for the different antenna designs. At each maximum vertical distance, the horizontal read distances were measured.

Antenna design (3 × 25 ft)	Vertical read distance (ft)	Horizontal read distance (ft)
Vertical (90°)	4	2.92
Intermediate angle (52°)	3	1.75
Intermediate angle (30°)	2	2.0
Hugging	1	4.6

Best antenna tested

3-foot wide vertical antenna design



Improve it by

- placing ferrite on face and not bottom of gate
- placing ferrite on face and only part of the bottom
- using a 5-foot wide antenna

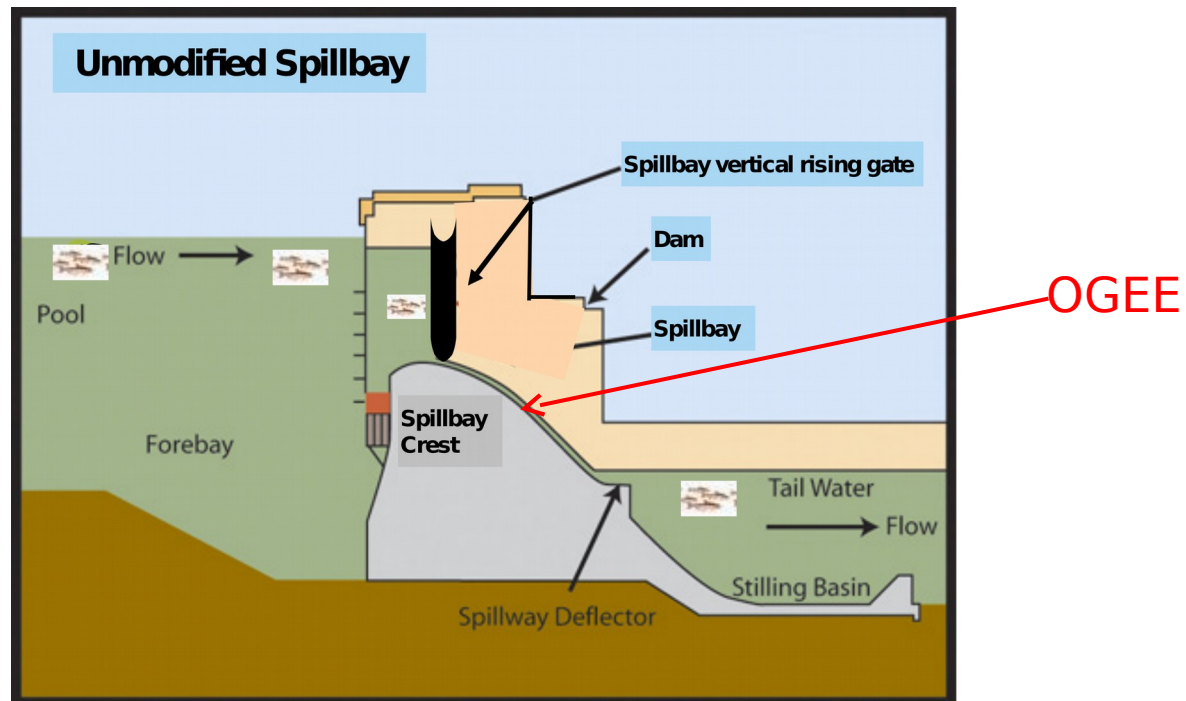
One Next Question

What does the antenna housing look like?

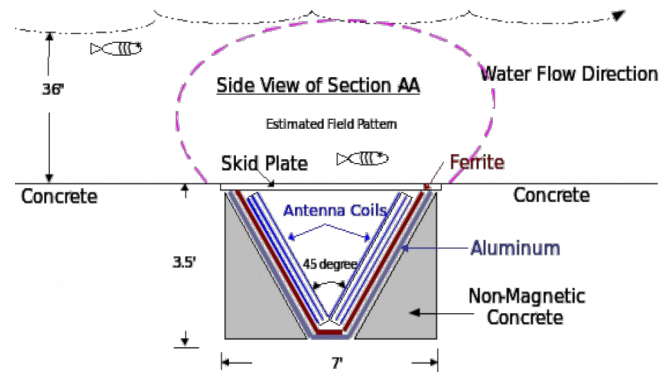
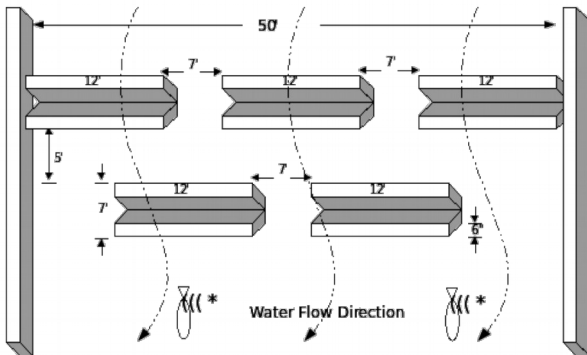
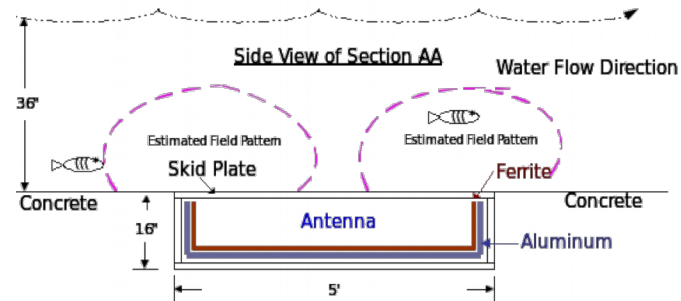
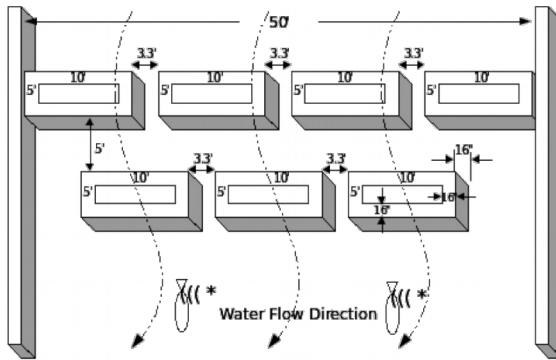
- It needs to minimize hydraulic impact
- It needs to stay attached
- It needs to be protected from debris

Alternative Approaches

- Ogee-based antennas
- Antennas incorporated into new spillbay gate design



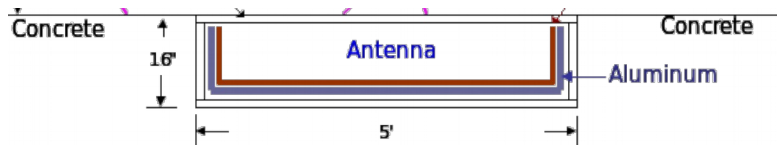
Ogee-based PIT-tag System



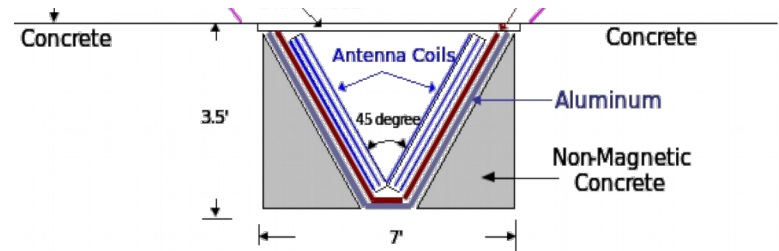
- Both designs would include redundant antenna arrays
- Both designs would allow multiple antennas to be installed across the 50' width

Results from Laboratory Tests with 5' by 10' antennas

- activated tags 4-6' above antenna edges
- was gap in middle of antenna



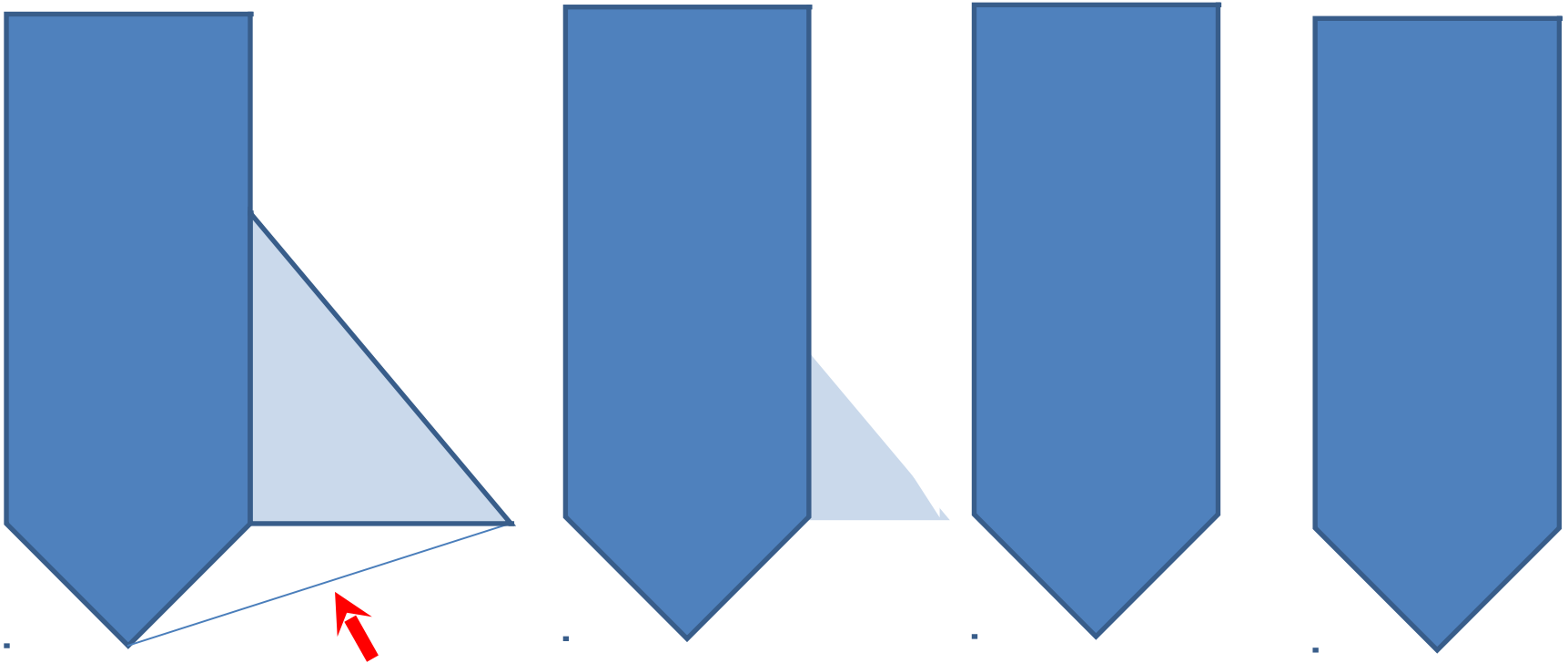
- activated tags 4' above entire antenna
- field width at 4' was 8'



Width was 40" not 7'

currently testing with smaller antennas to reduce potential for tag collision

POSSIBLE ANTENNAS IN NEW SPILLGATE DESIGN



- Some designs would still allow water to go through bottom of main gate portion
- Some designs would allow narrower gate design (do need access to antennas)
- **NONE** of the designs would include redundant antenna arrays
- **ALL** designs would allow multiple antennas to be installed across the 50' width

NEXT STEPS?



- Where should the antennas go?
- Do we do something with current gates or new gates?
- Do we wait for results from Ice Harbor Dam?
- What are the hydraulic limitations for antenna housings attached to gates?